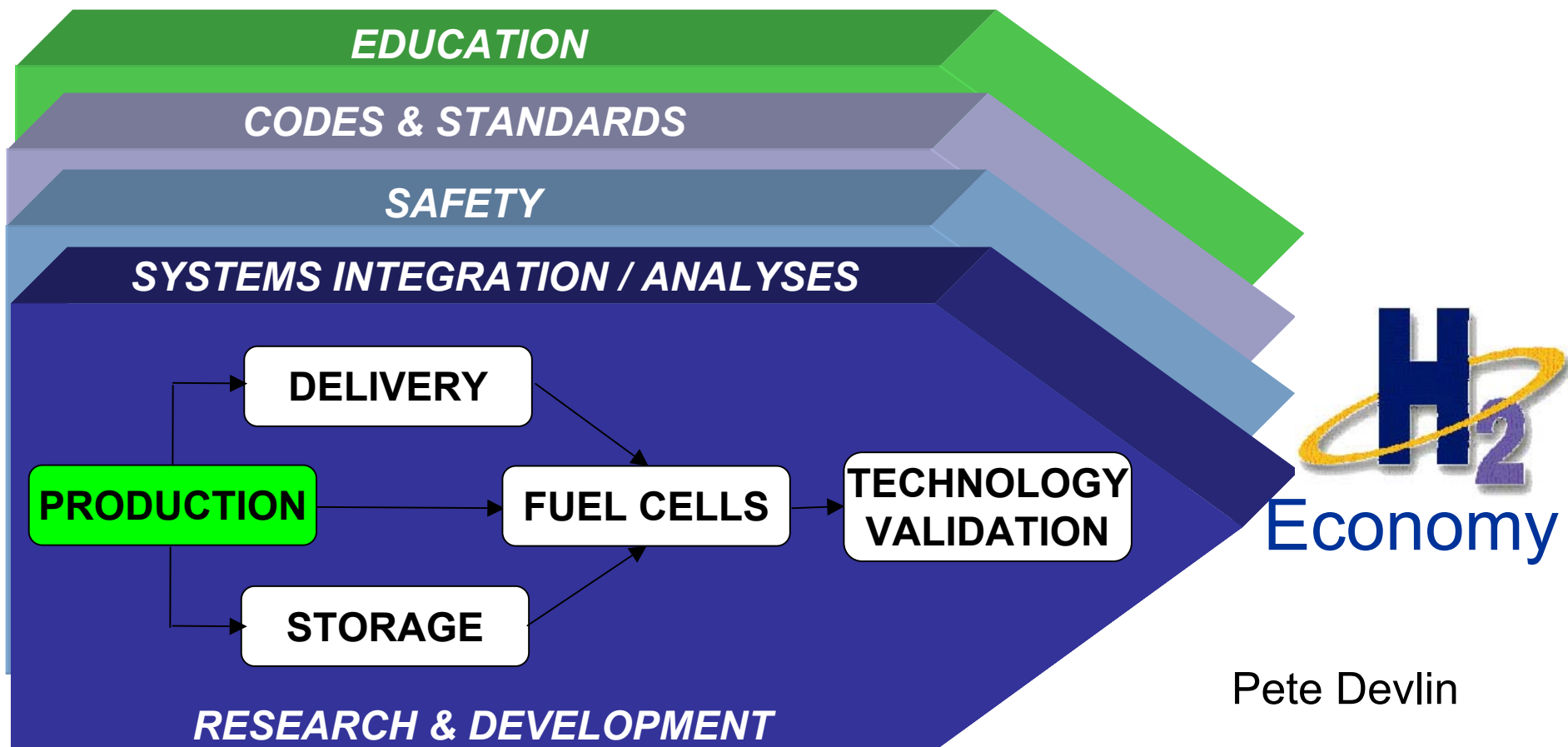




Hydrogen Production





Hydrogen Production Goals and Objectives

Goal : Research and develop low cost, highly efficient hydrogen production technologies from diverse, domestic sources, including fossil, nuclear, and renewable sources.

Objectives for 2010

- Reduce the cost of distributed production of hydrogen from natural gas and/or liquid fuels to \$1.50/gallon gasoline equivalent (\$1.50/kg delivered, untaxed) at the pump [without carbon sequestration];
- Develop and demonstrate technology to supply purified hydrogen from biomass at \$2.60/kg at the plant gate;
- Generate hydrogen with water electrolysis at a capital cost of \$300/kWe with 73% system efficiency at 5,000 psi.



Objectives (cont'd)

- Develop advanced photolytic hydrogen generation technologies.
 - By 2015, demonstrate direct photoelectrochemical water splitting with a plant-gate hydrogen production cost of \$5/kg
 - By 2015, demonstrate an engineering-scale photobiological system which produces hydrogen at a plant-gate cost of \$10/kg.
- By 2015, research and develop high and ultra-high temperature thermochemical processes to convert hydrogen from high temperature heat sources (nuclear or solar).
- Evaluate other technologies that have the potential for cost effective sustainable production of hydrogen and fund appropriate research.



Hydrogen Production Key Milestones

- Develop hydrogen production technologies for distributed systems using natural gas with projected cost of \$3.00/kg hydrogen at the pump, by 3rd quarter, 2004.
- Select and develop biomass gasification technologies to reduce hydrogen cost to \$3.30/kg by 4th quarter, 2005.
- Develop electrolyzer technologies that reduce costs to \$3.75/kg at 5,000 psi with 65% energy efficiency by 4th quarter, 2005.
- Identify or develop photoelectrochemical material that has solar-to-hydrogen efficiency of 7.5% and 1,000 hours durability by 4th quarter, 2005.

